II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF JUDITH BASIN CONSERVATION DISTRICT TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).)

1. The Judith Basin Conservation District is a public entity organized and operated under the State Conservation District's Act (Mont. Code Ann. § 76-15-101, et seq.) and is a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. 28-A, p. 2.)

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY JUDITH BASIN CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).)

2. The Judith Basin Conservation District has applied to reserve an annual amount of 2,762 acre feet of water to be diverted at a maximum rate of 26 cfs to provide irrigation for 10 projects totaling 1,511 acres. (Bd. Exh. 28-A, pp. 7 and 16.) The purpose of the reservation is to reserve water that will be put to beneficial use by district cooperators (individual landowners and lessees) within the district. The locations, amounts of water requested, sources of water, and acreage of the individual projects applied for are as set forth in the application filed by the Judith Basin Conservation District.

3. The Judith Basin Conservation District seeks to reserve water for future irrigation. (Bd. Exh. 28-A, p. 8.) Irrigation is a beneficial use as defined by ARM 36.16.102(3). (Bd. Exh. 40, p. 248.)

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY JUDITH BASIN CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. The Judith Basin Conservation District has established a need for the reservation pursuant to 36.16.107B(2) based on the following:

a) Water use in the Missouri basin and existing water rights together with new permits could leave little water available for future use by the District. A priority date of July 11, 1985 allows water use by the District. Furthermore, the potential exists for conflict with downstream states over water use in the Missouri basin (Bd. Exh. 28-A, pp. 9 and 10.)

b) The districts desires to improve long-term planning for

its water use and there are at present economic constraints to near term development on a permit by permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states (Bd. Exh. 40, p. 248.)

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY JUDITH BASIN CONSERVATION DISTRICT (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. The Judith Basin Conservation District has established methodologies used to determine the amounts requested. The water-use efficiencies associated with the diversionary uses are reasonable. (Bd. Exh. 28-A, p. 11-16; Bd. Exh. 3; Bd. Exh. 2) as required by ARM 36.16 107B(3).)

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY JUDITH BASIN CONSERVATION DISTRICT IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. As required by Mont. Code Ann. § 85-2-316(4)(a)(iv); and ARM 36.16.107B(4), for the Board to adopt a reservation it must find that it is in the public interest.

7. The benefit-cost factor [ARM 36.16.107B(4)(a)] requires a weighing of the benefits and costs of each reservation application. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. (DFWP Exh. 31, Duffield Dir., p. 4.)

8. The benefit/cost test may be stated in a formula, as follows:

Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4.)

9. In general, the benefits and costs of irrigation projects in this proceeding are as follows:

Direct Benefits:	Irrigation Crop Revenues
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs

Indirect Costs: Foregone instream uses
- Fish and Wildlife
- Recreation
- Hydropower
- Water quality
- Economic opportunity costs to parties other than reservant

10. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation for each project should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6.)

11. The direct benefits of water for irrigation was determined by DNRC, based on a detailed analysis of each project. (Bd. Exh. 41, p. 35.) For each project, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for each proposed project. (Bd. Exh. 41, p. 35.) The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis are set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

12. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

13. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

14. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have an incentive to use the best management practices. (Tubbs Cross, Tr. Day 3, p. 252.)

15. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for a profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

16. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tr. Day 3, Tubbs Cross, p. 253.)

17. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.) The method used by DNRC to calculate irrigation values is proper. (MPC Exh. 4, Bucher Dir., p.3.)

18. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

19. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

20. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

21. Estimates of water consumed by each project derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

22. The model considers crop water requirements and irrigation efficiencies for each project. In addition, no return flows are assumed for 65 proposed irrigation projects located on higher benchlands. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

23. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

24. The direct benefits as calculated by DNRC do not adequately take into account certain indirect benefits of the irrigation projects including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exhibit 1.)

25. Recreation values per acre-foot of water were calculated as follows using the contingent valuation method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Headwaters	$35.00	$8.23
Upper Missouri	$19.46	$4.76

Marias/Teton	$ 5.81	$1.63
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bd. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

26. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

27. As calculated recreational value is determined on the basis of impacts that would reduce instream flow basin wide. (DFWP Exh. 31, Duffield Dir., p. 36.) Based on the relative priority of the DFWP reservation in this proceedings the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

28. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of irrigation use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

29. After a review of all factors, hydropower values in the Judith Basin Conservation District were found to be $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated down stream. (See Bd. Exh. 40, Table 6-43.)

30. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.) The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water (Findings of Fact 28).

31. Taking into account all values and costs, a comparison of project benefits to hydropower costs per acre-foot of water for each project proposed by the district is as follows:

PROJECT	VALUE	COST	NET VALUE
JB-21	13.81	7.54	6.27
JB-61	27.26	7.54	19.72
JB-111	20.79	7.54	13.26
JB-231	11.87	7.54	4.33
JB-232	11.87	7.54	4.33

JB-261	28.90	7.54	21.37
JB-281	45.35	7.54	37.81
JB-309	-0.26	7.54	-7.80
JBI-2	10.62	7.54	3.08
JBS-3	49.72	7.54	42.18

32. Based on this analysis, the expected net benefits for projects JB-21, JB-61, JB-111, JB-231, JB-232, JB-261, JB-281, JBI-2, JBS-3 exceed costs. However, with water available at 8 years out of 10 projects JB-111, JB-231, JB-232, JB-309, and JBI-2 are unlikely to be feasible financially. (Board Exh. 28-C, Table 6.)

33. By definition, "net benefits" mean indirect and direct benefits less indirect and direct costs. Indirect costs include economic opportunity costs that the requested flow reservation mays have to parties other than the reservant. (ARM 36.16.107B(4)(b).) Thus, this factor is similar to the benefit/cost criteria upon which findings of fact have been made above.

34. Granting instream flow reservations to Department of Health and Environmental Sciences and Department of Fish Wildlife and Parks in all reaches requested, granting the projects identified in Findings of Fact 35 as having a net value greater than zero with financial feasibility that is likely and not granting the projects identified in Findings of Fact 35 as having a net value less than zero, and granting all instream flow reservations priority over all irrigation projects results in the greatest net benefits to society.

35. No reasonable alternatives to the projects that have reservations granted were identified that had greater net benefits.

36. Failure to reserve water for these projects will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 28-A, pp. 26-27.)

37. For the projects which had benefits exceeding costs and financial feasibility water was found to be physically available. However on Running Wolf Creek there is water physically available for only one project. (Bd. Exh. 28-A, pp. 14, 24, 109 and 110; Bd. Exh. 28-C, pp. 5-11.) It would not be in the public interest to grant a reservation for a consumptive use when the reservation could never be exercised. Of the two projects on Running Wolf Creek JBS-2 is the more feasible. Therefore it is in the public interest to grant a reservation on Running Wolf Creek to project JBS-2 only and not grant a reservation for project JB-261.

38. There are adverse effects to other resources that may result from development of some of these projects. (Bd. Exh. 28-

C, Table 9, and pp. 17; Bd. Exh. 40, pp. 212; Transcript Day 4, pp. 106-112, 115-119, 126 and 127.)

39. If conditioned that all projects must comply with all health and water quality laws, and subordinated to all instream flow reservation these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

40. The benefits of granting a reservation for these projects which qualify under the benefit cost analysis do not exceed those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8).)

41. The Judith Basin Conservation District has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 28-A, p. 25) as required by ARM 36.16.107B(7).)

42. The applicant District is capable of exercising reasonable diligence towards feasibly financing its project(s), and applying reservation water to beneficial use in accordance with the management plan. (ARM 36.16.107B(7).)

43. The water reservation of the applicant will be used wholly within the state and only within the Missouri River basin. (ARM 36.16.107B(5) and (6).) Certain projects contemplate the use of groundwater. Further studies will be needed for these projects in order to determine exactly how groundwater withdrawals will affect local stream flow conditions. (MPC Exh. 4, Bucher Dir., p. 6).

44. As conditioned, and subject to existing water rights with an earlier priority date, the Judith Basin Conservation District's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

III. CONCLUSIONS OF LAW

1. Judith Basin Conservation District is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).)

2. The purpose of the Judith Basin Conservation District application is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).)

3. The need for the Judith Basin Conservation District has been established. Specifically, the Conservation District has established that there is a reasonable likelihood that future in-

state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).)

4. Judith Basin Conservation District has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).)

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by Judith Basin Conservation District as modified and conditioned herein is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4).)

6. Upper Missouri River water reservations approved by the board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this order) the application of the Judith Basin Conservation District is granted for the following projects: JB-21, JB-61, JB-281, and JBS-3. The amount of diversion, volume of diversion, places of diversion and places of use are as set forth in the reservation application of Judith Basin Conservation District for those particular projects and by reference are made a part of this Order.The total amount of water reserved for this applicant is 731 acre-feet at a flow rate not to exceed 6.04 cfs to serve a total of 402 irrigated acres.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Judith Basin Conservation District shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish

Wildlife and Parks, and United States Department of the Interior (Bureau of Land Management). The reservation shall have equal priority with all other reservations granted to Conservation Districts. The reservation shall have priority over any reservation granted to the Bureau of Reclamation with a priority date of July 1, 1985.

4. Any and all liability arising from the reservation or the use of the reservation is the sole responsibility of the applicant. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of Judith Basin Conservation District reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.